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ALIGNMENT OF ALTERNATIVE DELIVERY MODES OF LEARNING FOR GRADUATE SCHOOL STUDENTS BASED ON LEARNER INTERNET CONNECTIVITY AND ACCESS TO DEVICES

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ABSTRACT

This preliminary study aimed to characterize the profile of the graduate school students of Nueva Ecija University of Science and Technology based on access to educational devices and internet connectivity. These were used as a basis for determining the appropriate alternative mode of delivery of education for graduate school students. Descriptive design was utilized with frequency and percentage as descriptive tools. The participants were 847 students from the different programs of the Graduate School and a survey instrument was administered through social media and google form platforms. Results showed that majority of the graduate students have access to educational devices, however, they only had weak internet access. Based on these characteristics, Blended Teaching and Learning, specifically Face-to-Face (F2F) and Remote Teaching and Learning (RTL) through a combination of offline and online instructional materials and asynchronous and synchronous learning activities can be prescribed. However, when broken down per program, it was found that majority of the students under the Doctor of Education-Major in Industrial-Technological Education, Doctor of Philosophy in Engineering Management, Doctor of Philosophy in Educational Management, Doctor of Philosophy in Public Administration, and Doctor of Philosophy in Business Administration programs have full internet access and access to educational devices, which would suggest that Blended Learning and Teaching using F2F + RTL (Online Synchronous Activities) model will be appropriate. Additionally, students enrolled under the remaining programs of Doctor of Philosophy in Science Education, Doctor of Philosophy in Mathematics Education, Master of Science in Information Technology, Master of Arts in English-Major in Applied Linguistics, Master of Arts in Teaching-Major in Vocational-Technological Education, Master of Arts in Teaching-Major in Physics, Master of Arts in Teaching-Major in Science, Master of Arts in Teaching-Major in Mathematics, Master of Engineering Management, Master of Education Management, Master of Public Administration, and Master of Business Administration programs, the majority have a weak internet connection but have access to educational devices which means that Face-to-Face (F2F) and Remote Teaching and Learning (RTL) may be recommended for use.

INTRODUCTION

The COVID-19 pandemic has disrupted the educational system, not only in the Philippines, but worldwide. According to UNESCO (2020), more than 1.18 billion learners worldwide are affected by the closing of schools and suspension of classes as a bid to prevent the further spread of the virus. This is 67.7% of total enrolled learners, brought about by 144 country-wide school closures. In the country alone, we have an estimated 30.7 million learners. Of this, more than 28 million Filipino learners are affected, with 1.81 million in the pre-primary, 14 million in the primary, 9 million in the secondary, and 3.59 million in the tertiary education.

The Nueva Ecija University of Science and Technology (NEUST) is one of the leading developers of professionals for the numerous basic and higher educational institutions as well as industries, not only in the province but also in the region. It has a social responsibility of providing quality education even during a pandemic, while not compromising the safety of its personnel and students.

As an immediate response to this disruption, NEUST implemented emergency remote teaching and learning as an alternative mode of delivery of education. Emergency remote teaching and learning can be a transitional model, a temporary approach during public emergency period, while an HEI is preparing to transition to more flexible forms or models of online teaching and learning. It simulates conventional classes, thus, minimal changes in the course design of the subject is needed. Since the mode of delivery is online, this model requires a reliable internet connection for both the teacher and the learner as well as access to educational devices. Two criteria which are usually problematic for learners coming from diverse backgrounds with varying access to resources. In order for the University to be able to appropriately respond to these challenges, there is a need to assess the capabilities of its students. These will determine the appropriate learning model or approach to be implemented within a college and its programs.

Thus, this study aimed to characterize the profile of students of the Graduate School of the University in relation to resources for remote teaching and learning. Specifically, it focused on describing the profile of the students in terms of access to internet and access to educational devices. Access to educational devices and internet connectivity were then used as basis for determining the appropriate learning approach and model.

METHODOLOGY

This research study utilized descriptive design and frequency and percentage were used to characterize the profile of the participants. The participants of this study were the 847 students enrolled under the following programs of the Graduate School of NEUST: Doctor of Education-Major in Industrial-Technological Education, Doctor of Philosophy in Science Education,

Doctor of Philosophy in Mathematics Education, Doctor of Philosophy in Engineering Management, Doctor of Philosophy in Educational Management, Doctor of Philosophy in Public Administration, Doctor of Philosophy in Business Administration, Master of Science in Information Technology, Master of Arts in English-Major in Applied Linguistics, Master of Arts in Teaching-Major in Vocational-Technological Education, Master of Arts in Teaching-Major in Physics, Master of Arts in Teaching-Major in Science, Master of Arts in Teaching-Major in Mathematics, Master of Engineering Management, Master of Education Management, Master of Public Administration, and Master of Business Administration. Collection of data was done through an online survey questionnaire which was distributed through social media platforms and email services.

RESULTS AND DISCUSSION

Out of the 847 students, only 779 participants answered the survey on internet access connectivity, as shown in Figure 1. There were 279 (35.82%) students who have full internet access. However, 483 (62%) have weak internet connection while 17 (2.18%) have no access to internet. Only 746 of the respondents answered the survey for access to educational devices, of which 646 (86.60%) have access while 100 (13.40%) have no access.

Majority of the students can only access online learning materials and activities using weak internet connection provided by their mobile devices. Access to internet using mobile network data is unstable since it relies on the signal strength of the service provider within the area. In terms of access to educational devices, majority of the participants have access to laptops and computers. However, aside from these devices, smartphones which are common among individuals nowadays can also be utilized as alternative educational devices.

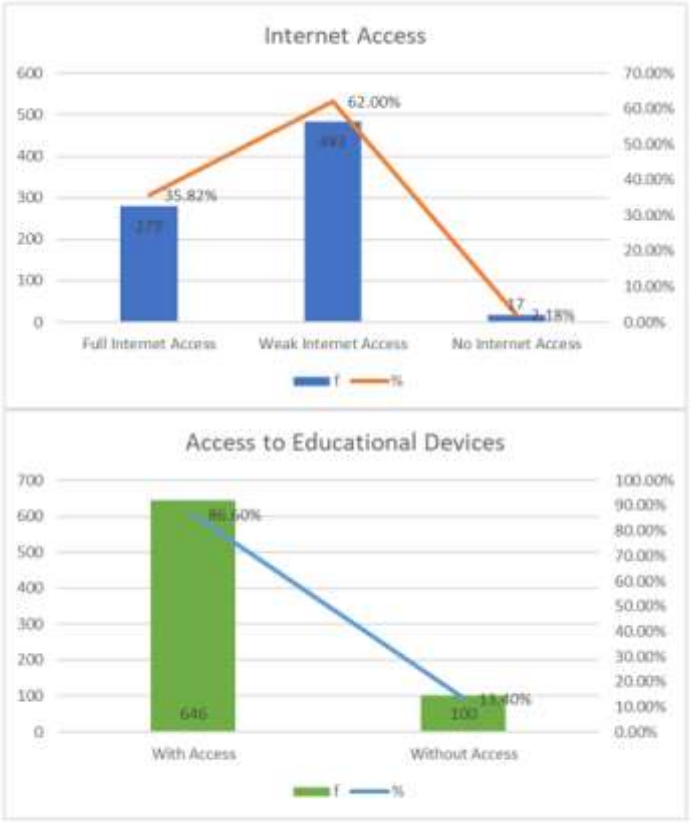

Figure 1: Distribution of Respondents According to Internet Connectivity and Access to Educational Devices

The type of internet connectivity and access to educational devices of students of the Graduate School suggests that Blended Teaching and Learning (BTL) might be an appropriate educational delivery mode which is a combination of face-to-face (F2F) and remote teaching and learning (RTL). The type of instructional materials (IMs) and the type of learning activities (LAs) in BTL will depend on the teacher and student access to internet and educational devices.

There are four types of approaches in BTL: F2F + RTL (Non-digital/ Offline IMs), F2F + RTL (Digitized/digital-offline IMs + Non-digital IM), F2F + RTL (Offline + Online IMs and Synchronous/Asynchronous Activities), and F2F + RTL (Online Synchronous Activities).

For students with full internet access and access to educational devices, F2F + RTL (Online Synchronous Activities) is appropriate. In this approach, remote teaching is fully online. The instructional materials used by the teacher are all digital and internet access is required to download them. The University Learning Management System plays a crucial role in this approach since it is the platform for learner activities (learner-learner interactions, learner-content interactions, and learner-teacher interactions). It is also thru the LMS that formative assessment and monitoring of student progress is done. The F2F is only done as a means of submission of or conduct of summative assessment, which can be held once a month or depending on the prescribed schedule of the subject.

Students with access to educational devices but weak internet access can benefit more from F2F + RTL (Offline + Online IMs and Synchronous/Asynchronous Activities) where there is an integration of online components with the offline IMs. In this approach, F2F is still used as a means for submission of or conduct of summative assessment. The online component can be synchronous sessions thru the University LMS while the offline IMs can be digitized such as videos.

For learners who have no access to internet but have access to educational devices either at home or in community centers, a F2F + RTL (Digitized/digital-offline IMs + Non-digital IM) approach can be used. In this approach, the print IMs are transformed to a digital format (digitized IMs) but can be accessed offline like video lectures saved in flash drives or compact discs. Like the other approaches, F2F is simply for conduct of proctored exams or summative assessments, or for submission of requirements.

F2F + RTL (Non-digital/Offline IMs) is appropriate for students who have no access to internet or educational devices. In this approach, print IMs such as books and modules are used. The ratio of F2F to RTL is flexible and will depend on the restrictions in space as mandated by physical distancing. F2F can still be used for summative assessment and monitoring of progress. Also, radio and TV instruction may be considered if they are available in the community.

Since majority of the graduate school students have access to educational devices and internet access, albeit weak and unstable, Blended Teaching and Learning, specifically Face-to-Face (F2F) and Remote Teaching and Learning (RTL) through a combination of offline and online instructional materials and asynchronous and synchronous learning activities may be appropriate to use.

However, this is simply an overview. The type of educational delivery mode can be more effectively determined in the program and classroom level. Table 1 presents the comparison of internet connectivity and access to educational devices per program of the Graduate School.

Programs	Accessibility of Internet						Accessibility of Educational Devices			
	Full Internet Access		Weak Internet Access		No Internet Access		With Access		Without Access	
	f	%	f	%	f	%	f	%	f	%
Doctor of Education-Major in Industrial-Technological Education										
	8	**57%**	6	43%	0	0%	**14**	**100%**	0	0%
Doctor of Philosophy in Science Education										
	6	25%	**16**	**67%**	2	8%	**19**	**83%**	4	17%
Doctor of Philosophy in Mathematics Education										
	9	35%	**15**	**58%**	2	8%	**23**	**92%**	2	8%
Doctor of Philosophy in Engineering Management										
	16	**59%**	11	41%	0	0%	**26**	**96%**	1	4%
Doctor of Philosophy in Educational Management										
	25	**64%**	14	36%	0	0%	**39**	**100%**	0	0%
Doctor of Philosophy in Public Administration										
	6	**55%**	5	45%	0	0%	**10**	**91%**	1	9%
Doctor of Philosophy in Business Administration										
	27	**69%**	12	31%	0	0%	**35**	**92%**	3	8%
Master of Science in Information Technology										
	28	42%	**38**	**57%**	1	1%	**62**	**93%**	5	7%
Master of Arts in English-Major in Applied Linguistics										
	15	23%	**49**	**75%**	1	2%	**56**	**85%**	10	15%
Master of Arts in Teaching-Major in Vocational-Technological Education										
	19	28%	**46**	**68%**	3	4%	**58**	**87%**	9	13%
Master of Arts in Teaching-Major in Physics										
	0	0%	**1**	**100%**	0	0%	**1**	**100%**	0	0%
Master of Arts in Teaching-Major in Science										
	3	13%	**21**	**88%**	0	0%	**22**	**96%**	1	4%
Master of Arts in Teaching-Major in Mathematics										
	4	24%	**12**	**71%**	1	6%	**16**	**94%**	1	6%
Master of Engineering Management										
	18	24%	**58**	**76%**	0	0%	**45**	**75%**	15	25%
Master of Education Management										
	17	29%	**37**	**63%**	5	8%	**46**	**96%**	2	4%
Master of Public Administration										
	6	18%	**27**	**79%**	1	3%	**29**	**88%**	4	12%
Master of Business Administration										
	72	38%	**115**	**61%**	1	1%	**145**	**78%**	42	22%

The results showed that across all programs, majority of graduate students have access to educational devices. Variation can only be observed in terms of students' access to internet connectivity. Based on the dominant profile, the following can be observed and prescribed:

Table 2: Alternative Mode of Delivery of Education Category for Graduate School Programs

Graduate School Program	Internet Connectivity and Access to Educational Devices	Suggested Alternative Mode of Delivery of Education
1. Doctor of Education-Major in Industrial-Technological Education 2. Doctor of Philosophy in Engineering Management 3. Doctor of Philosophy in Educational Management 4. Doctor of Philosophy in Public Administration 5. Doctor of Philosophy in Business Administration	Full internet access and with access to educational devices	Blended Teaching and Learning F2F + RTL (Online Synchronous Activities)
1. Doctor of Philosophy in Science Education 2. Doctor of Philosophy in Mathematics Education 3. Master of Science in Information Technology 4. Master of Arts in English-Major in Applied Linguistics 5. Master of Arts in Teaching-Major in Vocational-Technological Education 6. Master of Arts in Teaching-Major in Physics 7. Master of Arts in Teaching-Major in Science 8. Master of Arts in Teaching-Major in Mathematics 9. Master of Engineering Management 10. Master of Education Management 11. Master of Public Administration 12. Master of Business Administration	Weak internet access and with access to educational devices	Blended Teaching and Learning F2F + RTL (Offline + Online IMs and Synchronous/ Asynchronous Activities)

Majority of the students under the Doctor of Education-Major in Industrial-Technological Education, Doctor of Philosophy in Engineering Management, Doctor of Philosophy in Educational Management, Doctor of Philosophy in Public Administration, and Doctor of Philosophy in Business Administration programs have full internet connectivity and access to educational devices. This implies that for these programs, F2F + RTL (Online Synchronous Activities) may be utilized.

For students under the Doctor of Philosophy in Science Education, Doctor of Philosophy in Mathematics Education, Master of Science in Information Technology, Master of Arts in English-Major in Applied Linguistics, Master of Arts in Teaching-Major in Vocational-Technological Education, Master of Arts in Teaching-Major in Physics, Master of Arts in Teaching-Major in Science, Master of Arts in Teaching-Major in Mathematics, Master of Engineering Management, Master of Education Management, Master of Public Administration, and Master of Business Administration programs, , majority have a weak internet connection but have access to educational devices. These suggest that F2F + RTL (Offline + Online IMs and Synchronous/Asynchronous Activities) may be prescribed and used.

CONCLUSION AND RECOMMENDATIONS

Determining the appropriate delivery mode of learning to be used requires an assessment of the resources available for learners. Although Graduate School students are already professionals, they also experience difficulties and challenges when it comes to internet connectivity and educational devices which might affect their learning process, particularly in this time of pandemic. To manage these learning hindrances, the appropriate delivery mode of learning should be utilized.

Generally, graduate school students have weak access to internet, although they have access to educational devices. Thus, F2F + RTL (Offline + Online IMs and Synchronous/Asynchronous Activities) may be prescribed and used in teaching their subjects. However, a mixed model approach can also be used depending on the characteristics of students under each program. Students under the Doctor of Education-Major in Industrial-Technological Education, Doctor of Philosophy in Engineering Management, Doctor of Philosophy in Educational Management, Doctor of Philosophy in Public Administration, and Doctor of Philosophy in Business Administration programs may use F2F + RTL (Online Synchronous Activities) may be utilized while the students of Doctor of Philosophy in Science Education, Doctor of Philosophy in Mathematics Education, Master of Science in Information Technology, Master of Arts in English-Major in Applied Linguistics, Master of Arts in Teaching-Major in Vocational-Technological Education, Master of Arts in Teaching-Major in Physics, Master of Arts in Teaching-Major in Science, Master of Arts in Teaching-Major in Mathematics, Master of Engineering Management, Master of Education Management, Master of Public Administration, and Master of Business Administration programs can utilize F2F + RTL (Offline + Online IMs and Synchronous/Asynchronous Activities) model.

Since this is a preliminary study, there is a need to develop a more comprehensive assessment of the graduate school programs in order to come-up with better effective alignment of alternative modes of delivery of education during this pandemic. Aside from the learners, faculty characteristics should also be observed, and not only availability of devices and internet connectivity should be investigated. There is also a need to investigate the level of digital literacy of both faculty and learners, as well as faculty course design skills for flexible learning.

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